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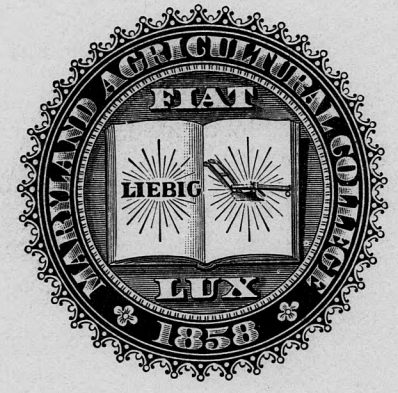

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Contributions and Correspondence Invited.

ADDRESS

Chemical Department, Maryland Agricultural College,

COLLEGE PARK, MD.

FEED STUFF INSPECTION.

The new Feed Stuff Law went into effect July 1st. It requires that all "concentrated commercial feeding stuff" and all "patented and trade-marked feeds" sold in this State, shall bear a guaranteed analysis stating the percentage of protein and fat contained therein. The law provides that such feeds shall be inspected and analyzed by the Maryland Agricultural College. In order to provide for the cost of such inspection and analysis it is provided that the manufacturers of such feeds be required to pay, annually, to the Maryland Agricultural College a license fee of $20 for each brand of concentrated feed.

The law was published in full in "Quarterly" No. 8, together with tables showing the average analysis of feeding stuffs, and also analyses of thirty samples of feeds found on sale in this State.

Since August we have obtained nearly 100 samples of feeds. Half of these, however, are "Condition Powders" and "feeds," put up in 25-cent packages, as cure-alls or quack medicine, and probably do not come under the law, and will not be analyzed at this time. The analysis of the remaining samples is not yet complete and will be published later.

Each of the concentrated feeds, cotton seed meal, linseed meal, gluten meal, etc., is controlled by a "trust," by which nearly all of the product on the market is handled.

When buying concentrated feeds, farmers should insist on a guarantee of protein and fat, and refuse to buy from parties who will not furnish this. Naturally it will take a little time to get the new law fully understood and in full operation.

Correspondence in regard to analysis of concentrated feeding stuff should be addressed to the

STATE CHEMIST,
College Park, Md.

ANALYSIS OF BUTTER AND OLEOMARGARINE.

(Abstract of graduating Thesis of Arthur E. Ewens, Class of 1900.)

It is not usual to make an analysis of butter for the purpose of grading it, or determining its excellence, as it often supposed. Butter is graded by the expert butter handler from the appearance, odor and taste of the sample. However, in scientific investigations, it is desirable to know the general composition of samples of butter, as given in the first part of the following table.

Water—Is always present, being held mechanically between the grains of butter; the usual amount is from 10 to 15 per cent. It may, however, be present in much larger amount, when it should be regarded as an adulteration.

Casein or curd, is not entirely separated from the butter in churning, it is the constituent of cream and milk from which cheese is made.

Salt is added by the butter maker to suit the taste. It is also, to a certain extent, a preservative.

The *butter fat* varies inversely as the other ingredients, water, salt and casein. The fat of butter and butter substitutes is composed of fatty acids in combination with glycerine. Some of the fatty acids, (mostly butyric acid) are soluble in water after being liberated from the glycerine, while the greater part is insoluble in water, melting to an oil when heated, but forming, when cooled, a solid wax-like mass that may be readily separted from the liquid and weighed.

The soluble acid is also volatile, when the water containing it is boiled, and may be condensed again by passing the vapor through a cooled tube. It will be noticed that the two methods of determination give nearly identical results. The determination of the soluble and the insoluble fatty acids affords a ready means of detecting adulteration in butter. The fats used in artificial butter contain practically no soluble acid, so that the amount of the soluble acid present, serves as a measure, of the amount of butter fat. Further, pure butter fat does not contain, as a rule, more than 88 per cent. of insoluble fatty acid, while oleomargarine contains 94 or 95 per cent.

Oleomargarine is usually "churned" with milk in order to give it a butter flavor.

The butter samples analyzed were of known purity.

The oleomargarine was obtained from dealers in Baltimore. The following table shows the results of my analysis of butter and oleomargarine:

SAMPLE.	Analysis of the Sample as received. (In per cent. or parts per hundred)				Analysis of the Fat. (In per ct. or parts per hundred)			Melting Point Degrees Centigrade.
	Water.	Casein.	Salt.	Fat.	Volatile Acids.	Soluble Acids.	Insoluble Acids.	
Butter No. 1.....	13.19	1.23	2.31	83.26	4.06	4.44	85.98	33.2°
Butter No. 2.....	11.84	0.88	2.33	83.88	3.85	3.73	88.09	32.8°
Oleomargarine No. 1.	13.00	1.02	3.87	82.12	0.08	0.43	94.11	38.6°
Oleomargarine No 2.	13.12	1.05	3.71	81.79	0.27	0.04	95.28	35.1°
Butter Average.....	12.52	1.06	2.32	83.57	3.96	4.09	87.04	33.0° *
Oleomar'ne Average.	13.06	1.04	3.77	81.96	0.18	0.29	94.70	36.8°

* 33° Centigrade is the same as 91.4° Fahrenheit.
36.8° " " " " " 98.2° "

COMPARATIVE ANALYSIS OF COAL GAS AND WATER GAS LIME.

(Abstract of Graduating Thesis of Mr. W. H. Weigand, Class of 1900.)

In a former number of this publication was given the results of an investigation of the composition of lime used for agricultural purposes, including gas lime from the gas works of Baltimore, where the "water gas" process is now in use. The results obtained from the analysis of the samples of gas lime were so different from what might have been expected from published statements in regard to the composition of gas lime that it was deemed desirable to continue the investigation. Accordingly, in the early part of the year 1900, samples of gas lime were obtained by the writer from the works of the Washington Gas Company, of Washington, D. C., where two different processes were in use. First, the old coal gas process, by which gas is made by heating gas coal (soft coal) in closed retorts; gas and tar are given off, the latter collects in the pipes and flows off, while the gas is "scrubbed" with water to remove ammonia and some other impurities, and, finally, passed through slacked lime in the purifying house and then into the gas-holder, and is then ready for distribution.

The "water gas" process, also called "oil gas" is entirely different. Hard coal is used, which is brought to a white heat in a furnace, then steam is passed over the heated coal. This decomposes the steam, setting free hydrogen, while the oxygen combines with the coal to form carbon monoxide; both are gasses and would burn with a non-luminous flame if not enriched by spraying oil into the heated gases. The oil "enriches" the gas so that it now burns with a luminous flame. The further process of purification is the same as with coal gas.

Both of the "fresh" samples, Nos. 1 and 3, were taken as the lime was being removed from the purifiers. The "exposed" samples were taken from piles which had been exposed to the air for a week or more, the time not being exactly known. The coal gas lime, especially the "fresh" sample, was highly colored—much more so than the water gas lime. The predominating shade being green, with blue, yellow and white, in streaks.

The analyses show that more carbon dioxide has been taken up by the "water gas" lime, and that in the coal gas lime more than half of the lime is still in the condition of slacked lime, but, in general, the two kinds are similar in composition.

The results of analysis are given below.

ANALYSIS OF COAL GAS AND WATER GAS LIME.

	1. Fresh Coal-Gas Lime.	2. Exposed Coal-Gas Lime.	3. Fresh Water-Gas Lime.	4. Exposed Water-Gas Lime.
Oxide of Lime, CaO	42.02	49.60	45.32	56.16
Oxide of Magnesia, MgO	1.14	.23	.11	.24
Phosphoric Acid, P_2O_5	.20	.50	.25	.10
Nitrogen, N	.01	.32	.05	.12
Sulfuric Anhydride, SO_3	.92	2 73	.63	2.03
Oxides of Iron and Alumina	4.41	3.90	1.84	3.35
Sulfur in Sulfides	.60	.28	.30	.42
Silica and Insoluble	2.54	2.56	2.13	2.10
Carbon Dioxide, CO_2	10.26	15.37	21.73	31.33
Moisture	27.45	9.60	20.96	2.72
Water, combined by difference	10.44	14.93	6.71	1.43
Oxide of Lime required to combine with Carbon Dioxide found	13.06	19.56	27.66	39.87

ANALYSIS OF OYSTER SHELLS AND SHELL LIME.

(Abstract of Graduating Thesis of Mr. C. G. Church, Class of 1900.)

The samples for this work were obtained at the Washington Gas Co's factory at the same time that Mr. Weigand obtained his samples, the two studies being complimentary and intended to follow each step through which lime passes at the gas-house.

The lime used in gas purification is shell lime, this being used because it is cheaper than stone lime. The shells used are mostly oyster shells, (sample No. 4), but with some clean shells, (sample No. 5). The composition of the two is nearly indentical. The shells are burned in a kiln near the gas works and, shortly after being drawn from the kiln the "burned" shells (sample No. 3,) now quick lime, are slacked by throwing water upon them from a hose, given slaked, or slacked lime (sample No. 1). This is then carted to the gas-house and dumped near the purifiers, (sample No. 2). The pile from which No. 1 sample was drawn had been in the pile for several days. Considerably more water is used than is necessary to combine chemically with the lime in slacking, so that it will be moist and not dusty; this is shown by the large amount of moisture in samples 1 and 2. This moisture is lost when the sample is heated for several hours at the temperature of boiling water. The water that is taken up chemically, however, is not lost until the sample is heated to a much higher temperature.

Sample No. 3 was probably not as thoroughly burned as usual, as it still contains nearly 10 per cent. of carbon dioxide; the burning of lime consisting in driving off the carbon dioxide. The following table contains the average of the results obtained:

ANALYSIS OF SHELLS AND SHELL LIME.

Constituents.	1—Freshly Slaked Oyster-Shell Lime.	2—Exposed Slaked Oyster-Shell Lime.	3—Freshly Burned Oyster-Shell Lime.	4—Unburned Oyster Shells.	5—Unburned Clam Shells.
Oxide of Lime, CaO	48.25	51.22	85.87	45.47	46.45
Oxide of Magnesia, MgO	.30	.34	.40	.31	.22
Carbon Dioxide, CO_2	3.44	2.53	9.93	40.23	42 83
Silica and Insoluble SiO_3	2 67	3.23	1.54	1.41	.27
Iron and Alumina, Fe_2O_3&$A1_2O_3$	3 10	3 16	2 02	1.17	2.08
Phosphoric Acid, P_2O_5	.15	Trace	Trace	Trace	Trace
Sulphuric Anhydride, SO_3	1.00	.65	.20	.24	.25
Moisture	24.37	26 11	.....	4.85	.53
Water, combined, by difference	16.72	12.76	.05	6.31	7.38

HUMBUG FERTILIZER.

The attention of this Department has been called to a "fertilizer" that is being advertised, and some of which has been sold, in the Northern part of the State. The bags are labelled as follows:

"Phosphoric Mixture, of Phosphorous, S. C. Bone, Ashes and Hen-Manure, by Jas. A. LeFevre, Littlestown, Pa."

An advertising "dodger" conveys the following information:

"Wonderful Phosphatic Deposit on Ore Bank Field * * * * near Littlestown, Adams co., Pa.—Natural Fossiliferous Deposit, * * *

This Phosphatic Deposit is prepared in the following manner, making it a rich fertilizer for all crops: ½ ton (or more) Phosphoric Deposit, ¼ ton (or more) Acidulated South Carolina Rock, and about ¼ ton wood-ashes and Hen-Manure—1 ton. * * * will sell on the following terms and conditions:—Will take obligations at five dollars per ton, (which will not more than pay for the S. C. Rock, ashes and manure), and will not ask for the money until the crop is made, then, if it brings as good crops as other fertilizers or better, the full price will be $10.00 per ton. * * *"

The stuff, by analysis, is found to contain:

Total Phos. Acid, 1.46 per cent.

Potash, 0.31 per cent., and traces of ammonia—not more than is found in ordinary soil. It does not contain the Dissolved S. C. Rock as claimed. It is not worth the bags that are required to hold it. We think that further comment is unnecessary.

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Maryland Agricultural College

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For further particulars, apply to

R. W. SILVESTER,
President Maryland Agricultural College,
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